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SIMULATION OF CONTROL OF MULTI-VARIABLE CONTROL LOOP: STEAM TURBINE

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Abstract
The paper deals with the description and simulation verification of one of possible methods to control of multivariable control loops. In this case, the so called main controllers, binding members and correction members are used. The proposed method of control combines classical way to ensure of autonomy of control loop via binding members and the use of the method of single-variable branched control loops with measurement of dominant disturbance variables to ensure of invariance of control loop via correction members. Main controllers can be proposed by arbitrary synthesis method. Simulation verifications of the control method are carried out for three-variable loop of a steam turbine. 14 refs.
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Key Words: *MIMO Control Loop, Synthesis, Autonomous Control, Invariant Control*

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MODELLING OF THE 3D MACHINING GEOMETRIC DEFECTS ACCOUNTING FOR WORKPIECE VIBRATORY BEHAVIOUR

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Abstract
In this paper, we present a three-dimensional manufacturing tolerancement model. Several researchers have interested to modelling the machining geometric defects. The most researchers are limited to kinematic and static study. Only some works are evoked the dynamic effects, especially the influence of the chatter phenomenon on the roughness of the machined surface. In this context, the paper presents a contribution for modelling and quantification of the machining geometric defects where the machining dynamic effects are considered. A developed method is established based on Homogeneous Transformation Method in subject to determine the kinematical deviations caused by part locating and relocating. The dynamic displacements due to clamping and machining forces are defined using Finite Element Method. The numerical results are then compared to published experimental results. 17 refs.
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Key Words: *Machining, Defects, Tolerancing, Dynamic*

Pages 78-90

FLEXIBLE MANUFACTURING SYSTEMS MODELLING AND PERFORMANCE EVALUATION USING AUTOMOD

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Abstract
In recent times flexible manufacturing systems emerged as a powerful technology to meet the continuous changing customer demands. Increase in the performance of flexible manufacturing systems is expected as a result of integration of the shop floor activities such as machine and vehicle scheduling. The authors made an attempt to integrate machine and vehicle scheduling with an objective to minimize the makespan using Automod. Automod is a discrete event simulation package used to model and simulate a wide variety of issues in automated manufacturing systems. The key issues related to the design and operation of automated guided vehicles such as flow path layout, number of vehicles and traffic control problems are considered in the study. The performance measures like throughput, machine and vehicle utilization are studied for different job dispatching and vehicle assignment rules in different flexible manufacturing system configurations. 21 refs.
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Key Words: *Flexible Manufacturing System, Simultaneous Scheduling, Automated Guided Vehicle, Simulation, Automod*

Pages 91-103

FMS PERFORMANCE UNDER BALANCING MACHINE WORKLOAD AND MINIMIZING PART MOVEMENT RULES

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Abstract
A simulation model is developed to evaluate the performance of a flexible manufacturing system with respect to time in system. The new rule to assign parts to machine-tools we propose, OOM (Only One Machine), designed to minimize parts movements performs poorer than WINQ (Work In Queue), a rule directed at balancing machine workload. Different numbers of automated guided vehicles (AGV) produce significantly different results with the best performance resulting with five AGVs. Three AGVs are too few to handle the transportation requirements, whereas seven may, to some extent, increase AGV blockage. The number of parts that can be entirely processed on one single machine is found to impact performance, but the impact is not consistent across the experimental conditions. Three rules to sequence parts to be processed are found to have a moderate impact when OOM assignment is employed, but have no impact under the WINQ assignment rule. 39 refs.
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Key Words: *Flexible Manufacturing System, OOM, Simulation, Time in System, WINQ*